Whereby for 1 kilogramme Si02, only 168 calories would be set free.
Further, one obtains, according to Pawloff (ibid.},
For 1 kilogramme SiOo with CaO to form Si08Ca 254 calories . . (54) „ 1 „ SiOo „ MnO „ (MnO);,(SiOa)a 134 calories (55)
,,1 ,, SiOo „ CaO „ SiO4Caa 384 „ „ (56)
„ 1 „ PA „ CaO „ PA,Ca4 1,131
For the foregoing object, only the final slag will eorne into consideration in which silicic and phosphoric acids are regarded as combined with the lime, and therefore heats of combination will be settled as under :
1 kilogramme SiOo with, lime at 384 calories . . (5(5) 1 „ PA „ „ U31 „ . . (57)
I. Influence of Silicon on the Heat Requirement.
Were it possible to produce in the open-hearth furnace pure iron from a charge which contained 99 kilogrammes iron and 1 kilogramme Si, so there would be 2 per cent, loss of charge (vide 43), and thus there would be obtained 98 kilogrammes iron, and from (42) 10*23 kilogrammes final slag. For satisfying the silica from. 1 kilogramme Si, there would be necessary 2*14 x 2*33=5 kilogrammes CaO or 10 kilogrammes limestone (from formulae (32) and (41).
The quantity of heat which would be derived from the furnace by the entire products would thus be
Calorins.
98 kilogrammes steel X 350 calories (from 48) . . 34,300 10-23 ,,
slag X 525 „ (from 49) . . 5,370
Carbonic acid set free from 10 kilogrammes limestone
10x180 calories (from 50) ..... 1.800 Total heat in products 41,470
Setting free Si from Fe ..... unknown
Decomposition of limestone 10X425 from (52) . . 4,250
Total heat requirement 45,720
Against this there would be developed by the reaction : 1 kilogramme Si yielding (from 53) 7,830 calorics On combination of 2*14 Si02 with lime there would be set free
2-14x384 (from 56)=822 calories 1 kilogrammePe would be burnt liberating 1,353,,
. Balance to be supplied by furnace 35,715
Thus the heat requirement for the production of 1 kilogramme steel would be ~'~ °=365 calories.